

الف) $\frac{x^2 - 9x}{x^3 - x} \geq 0 \Rightarrow \frac{x(x-9)}{x(x^2-1)} \Rightarrow \frac{-1}{+} \frac{+}{+} \frac{+}{+} \frac{+}{-}$
 $D_f = (-9, 0) \cup (0, 1) \cup [9, +\infty)$
 ب) $\frac{x^3 - x^2}{x^3 - x} \geq 0 \Rightarrow \frac{x^2(x-1)}{x(x^2-1)} \geq 0 \Rightarrow \frac{-1}{+} \frac{+}{+} \frac{+}{+}$
 $D_f = (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, +\infty)$

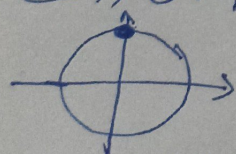
الف) $x + |x| > 0 \Rightarrow |x| > -x \Rightarrow D_f = \mathbb{R}^+$

ب) $x|x| > 0 \Rightarrow D_f = \mathbb{R}^+$

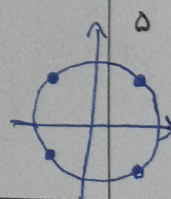
الف) $2 - [x] > 0 \Rightarrow [x] < 2 \Rightarrow x < 3 \Rightarrow D_f = (2, 3)$
 ب) $2 - [x] > 0 \Rightarrow [x] < 2 \Rightarrow x < 2 \Rightarrow D_f = (-\infty, 2)$

الف) $[x - \frac{1}{3}] + [x - \frac{1}{3} + 1] \geq 0 \Rightarrow [x - \frac{1}{3}] + [x - \frac{1}{3}] + 1 \geq 0$
 $2[x - \frac{1}{3}] \geq -1 \Rightarrow [x - \frac{1}{3}] \geq -\frac{1}{2} \Rightarrow x - \frac{1}{3} \geq 0 \Rightarrow D_f = [\frac{1}{3}, +\infty)$
 ب) $[x - \frac{1}{3}] + [-(x - \frac{1}{3})] \Rightarrow a \leq [a] + [-a] = -1$
 $x - \frac{1}{3} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{3} \Rightarrow D_f = \{x | x = k + \frac{1}{3}, k \in \mathbb{Z}\}$

الف) $\sin x - 1 \neq 0 \Rightarrow \sin x \neq 1 \Rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$



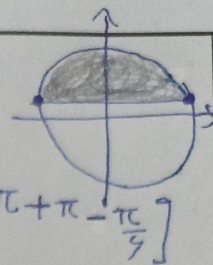
ب) $2\sin^2 x - 1 \neq 0 \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}} \Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2}$
 $D_f = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{4}\}$



الف) $\sin x \geq \frac{1}{2}$

$2k\pi + \frac{\pi}{6} \leq x \leq 2k\pi + \pi - \frac{\pi}{6}$

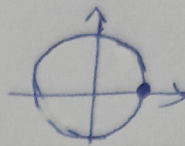
$D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \pi - \frac{\pi}{6}]$



ب) $\cos x \geq 1$

$D_f = \{2k\pi\}$

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الف) $-1 \leq |x| - 2 \leq 1 \Rightarrow 1 \leq |x| \leq 3$ $D_f = \{x \mid 1 \leq |x| \leq 3\} \Rightarrow D_f = [-3, -1] \cup [1, 3]$

ب) $-1 \leq x^2 + 2x + 1 \leq 1 \Rightarrow \begin{cases} x^2 + 2x + 1 \leq 1 \Rightarrow x^2 + 2x \leq 0 \Rightarrow x(x+2) \leq 0 \Rightarrow x \in [-2, 0] \\ x^2 + 2x + 1 \geq -1 \Rightarrow x^2 + 2x + 2 \geq 0 \Rightarrow (x+1)^2 \geq -1 \Rightarrow x \in \mathbb{R} \end{cases}$ $D_f = I \cap II \Rightarrow D_f = [-2, 0]$

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الف) $2 - \log_3(x-2) \geq 0 \Rightarrow \log_3(x-2) \leq 2 \Rightarrow x-2 \leq 9 \Rightarrow x \leq 11$

$x-2 > 0 \Rightarrow x > 2$ $D_f = x > 2 \cap x \leq 11 \Rightarrow D_f = (2, 11]$

ب) $x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow x < 0 \vee x > 1$

$D_f = (-\infty, 0) \cup (1, +\infty)$

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الف) $x^2 \neq -1 \Rightarrow D_f = \mathbb{R}$

ب) $x^n \neq 1 \Rightarrow x \neq 1 \Rightarrow D_f = \mathbb{R} - \{1\}$

ج) $x^n \neq 2 \Rightarrow x \neq \log_2^{\frac{1}{n}} \Rightarrow D_f = \mathbb{R} - \{\log_2^{\frac{1}{n}}\}$

د) $x^n \neq 3 \Rightarrow x \neq \log_3^{\frac{1}{n}} \Rightarrow D_f = \mathbb{R} - \{\log_3^{\frac{1}{n}}\}$

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الف) $x+1 \in \mathbb{W}$ $x \in \frac{\mathbb{W}-1}{1}$ $D_f = \{x \mid x = \frac{k-1}{1}, k \in \mathbb{W}\}$

ب) $\frac{x^2-2}{x^2-1} \in \mathbb{W}$ $x \in -\frac{-\mathbb{W}+2}{x^2-1} \Rightarrow x \in \frac{\mathbb{W}-2}{x^2-1}$

$D_f = \{x \mid x = \frac{wk-2}{x^2-1}, k \in \mathbb{W}\}$

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